



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/740,016 | 12/20/2000 | Shi-Tron Lin | 06484.0074 | 4271 |

22852 7590 03/31/2004

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER
LLP
1300 I STREET, NW
WASHINGTON, DC 20005

EXAMINER

NADAV, ORI

ART UNIT PAPER NUMBER

2811

DATE MAILED: 03/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/740,016

Applicant(s)

LIN ET AL.

Examiner

ori nadav

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-88, 92-96, 100, 101, 103, 105-116 and 121-137 is/are pending in the application.
- 4a) Of the above claim(s) 1-82, 93-95 and 128-134 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 83-88, 92, 96, 100, 101, 103, 105-116, 121-127 and 135-137 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2811

DETAILED ACTION

Newly submitted claims 128-134 are directed to the embodiment of figure 2 or 4, a non-elected embodiment (applicant elected the embodiment of figure 24 for examination). Accordingly, claims 128-134 are withdrawn from consideration as being directed to a non-elected invention.

Drawings

Figure 4E was received on 12/11/2003, and was approved by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 83-88 and 92, 100, 105-116, 125, 128, 129 135 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed limitations of segments having different constructions, as recited in claims 83 and 92, are unclear since the disclosure does not define whether the term "constructions" refers to the material, shape, size or any other character, with respect to the segments

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 96, 101, 103, 106, 107 and 123-124 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al. (6,236,073).

Hsu et al. teach in figure 5 and related text an electrostatic discharge protection device, comprising: a substrate 120 (figure 4); a first diffusion region 122 formed in the substrate; a second diffusion region 124 formed in the substrate adjacent to and spaced from the first diffusion region; plurality of contacts contact 130 for making a conductive connection to the first diffusion region; a channel (the area under gate 126) formed in a third region between the first and second diffusion regions; and a plurality of current divider segments 140 distributed within the first diffusion region, and

wherein the different shapes are selected from a square, a circle, a cross shape, a T shape, a V shape, a U shape, and an L shape, and the plurality of segments includes a first row of segments; each one of the first row of segments has a center-of-area, the respective centers-of-area are not aligned, wherein the plurality of segments are formed of polysilicon segments, field oxide segments, or a combination of polysilicon and field oxide segments, and wherein the segments include a first segment adjacent to a second segment and spaced apart from the second segment by a first gap in a first direction; the segments further include a third segment adjacent to the second segment and spaced apart by a second gap in the first direction; and the first gap being

Art Unit: 2811

larger than the second gap, a dielectric layer 125 formed over the channel, a conductive element 126 formed over the dielectric layer, wherein the conductive element is a polysilicon gate element; and the dielectric layer is an oxide layer, wherein at least one of the segments is positioned between the at least one contact and the channel, and wherein at least one of the plurality of current divider segments 140 is completely surrounded by the first diffusion region 122, formed in at least one of different shapes, sizes and orientations (positions) with respect to each other, and wherein a first current divider segment formed within the first diffusion region having a first portion (a first portion can be arbitrarily taken as an edge of the current divider segment), a longitudinal axis of the first portion being oriented at an angle neither parallel with nor perpendicular to a longitudinal direction of the channel region, wherein the first current divider segment further having a second portion. a longitudinal axis of the second portion being oriented at a second angle to the first portion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 83-88, 92, 96, 100-101, 103, 105-116, 121-127 and 135-137, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (5,721,439)

Art Unit: 2811

Lin teaches in figure 8 and related text an electrostatic discharge protection device, comprising: a substrate; a first diffusion region 87 formed in the substrate; a second diffusion region 88 formed in the substrate adjacent to and spaced from the first diffusion region; plurality of contacts contact 97 (figure 9) for making a conductive connection to the first diffusion region; a channel (the area under gate 80) formed in a third region between the first and second diffusion regions; and a plurality of current divider segments 84, 85, 86 distributed within the first diffusion region, wherein said segments include first and second segments formed of different constructions, and

wherein the different shapes are selected from a square, a circle, a cross shape, a T shape, a V shape, a U shape, and an L shape, and the plurality of segments includes a first row of segments; each one of the first row of segments has a center-of-area, the respective centers-of-area are not aligned, wherein the plurality of segments are formed of polysilicon segments, field oxide segments, or a combination of polysilicon and field oxide segments, and wherein the segments include a first segment adjacent to a second segment and spaced apart from the second segment by a first gap in a first direction; the segments further include a third segment adjacent to the second segment and spaced apart by a second gap in the first direction; and the first gap being larger than the second gap, a dielectric layer 41 (figure 5) formed over the channel, a conductive element 45 formed over the dielectric layer, wherein the conductive element is a polysilicon gate element; and the dielectric layer is an oxide layer, wherein at least one of the segments is positioned between the at least one contact and the channel, and wherein at least one of the plurality of current divider segments 84, 85, 86 is completely surrounded by the first diffusion region 87, formed in at least one of different shapes, sizes and orientations (positions) with respect to each other, and wherein a first current divider segment formed within the first diffusion region having a first portion (a

Art Unit: 2811

first portion can be arbitrarily taken as an edge of the current divider segment), a longitudinal axis of the first portion being oriented at an angle neither parallel with nor perpendicular to a longitudinal direction of the channel region, wherein the first current divider segment further having a second portion. a longitudinal axis of the second portion being oriented at a second angle to the first portion.

Regarding the claimed limitation of plurality of current divider segments include first and second segments formed of different constructions, this feature is inherent in Lin's structure, because different construction can be taken as having different shape, and Lin clearly teaches plurality of current divider segments having different shapes.

Lin does not teach in figure 8 plurality of contacts. Lin teaches in figure 9 plurality of contacts. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use plurality of contacts in the device of figure 8 in order to operate the device. Note that the device would not operate without contacts.

Regarding claim 86, Lin teaches substantially the entire claimed structure, as applied to claim 1 above, except stating that the largest dimension of each segment is less than or equal to substantially six times a length of the channel. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the largest dimension of each segment being less than or equal to substantially six times or 2.5 times a length of the channel in Lin's device, since it is within the skills of an artisan to adjust the dimension of each segment, subject to routine experimentation and optimization.

Art Unit: 2811

Regarding claim 88, Lin teaches centers of area of the rows are not aligned in a straight line.

Regarding claims 100-100 and 111, Lin teaches segments include a first segment formed of a polysilicon layer over a dielectric layer (figure 4); and the second segment 86 formed by a LOCOS process of a field oxide layer (figure 8). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the first segment formed of a polysilicon layer over a dielectric layer; and the second segment formed of a field oxide layer in Lin's device in order to provide better ESD protection to the device.

Regarding claims 121, 126-127 and 135-137, Lin teaches in figure 9 plurality of current divider segments (located just above gate 90) formed within the first diffusion region between a contact region 97 (the top contact region 97) and the channel (located under the lower gate 90). The area center and the weight *center* of the current divider segments formed within the first diffusion region is closer to the channel (under gate 90) than to the contact region 97 since all the current divider segments are closer to the channel (under gate 90) than to the contact region 97, wherein the first diffusion region is a drain and a collector, a the first diffusion region includes a heavily doped region, and at least one current divider segment is an implant blocking region completely surrounded by the heavily doped region.

Regarding claim 125, the claimed limitation of plurality of current divider segments randomly distributed within the first diffusion region, this feature is inherent in Lin's structure for the following reason. The phrase randomly distributed within the first

Art Unit: 2811

diffusion region can mean a set of elements having equal probability of occurrence within the first diffusion region. Lin teaches plurality of current divider segments having equal probability of occurrence within the first diffusion region. Therefore, Lin teaches plurality of current divider segments randomly distributed within the first diffusion region, as claimed.

Response to Arguments

Applicant argues that Lin does not teach plurality of current divider segments formed of different constructions.

The claimed limitations of segments having different constructions, as recited in claims 83 and 92, are unclear since the disclosure does not define whether the term “constructions” refers to the material, shape, size or any other character, with respect to the segments

Applicant argues that prior art does not teach plurality of current divider segments with different sized gaps between segments in a first direction.

The gaps between plurality of current divider segments do not have to be taken only between adjacent segments. Therefore, prior art teaches plurality of current divider segments having different sized gaps between different segments in a first direction.

Applicant argues that there is support in the specification for plurality of current divider segments, wherein each of the segments formed within the first diffusion region being closer to the channel than to the contact region, as recited in claim 121, because the disclosure recites positioning the plurality of current divider segments such that the

Art Unit: 2811

weight or area center of all segments in the drain region is closed to the gate or channel region than to the drain contacts.

The recitation of positioning the plurality of current divider segments such that the weight or area center of all segments in the drain region is closed to the gate or channel region than to the drain contacts does not mean that each of the segments formed within the first diffusion region is closer to the channel than to the contact region, as recited in claim 121.

Conclusion

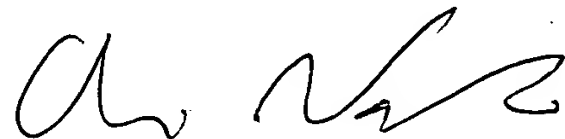
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2811

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(571) 272-1660**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308- 0956**



O.N.
3/25/04

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800